

REMARKS/ARGUMENTS

In view of the foregoing amendments and following remarks, favorable reconsideration is respectfully requested.

Claims 1 – 11 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,818,481 to Luton.

Luton is directed to a method of making an oxy-nitride dispersion strengthened alloy in which an aluminum alloy is cryomilled in the presence of liquid nitrogen and up to 1 wt.% oxygen to form oxy-nitrides in the alloy. See column 5, lines 20 – 24. For example, Luton states “[b]y the practice of the present invention, aluminum and alloys based on aluminum, may now be successfully mechanically alloyed, by cryogenic milling, to produce dispersion strengthened composite particles having a substantially homogeneous dispersion of aluminum oxy-nitride particles throughout the matrix.” See column 6, lines 56 – 62. Luton further states that under the processing conditions, the thermodynamics and kinetics are favorable for the formation of extremely fine oxy-nitride species through the reaction of aluminum, oxygen, and nitrogen. See column 5, lines 24 – 27.

In contrast to Luton, the claimed invention is based on the discovery that cryomilling an aluminum alloy in the presence of liquid nitrogen in a substantially oxygen free atmosphere results in the formation of aluminum nitrides that stabilize the alloy against grain growth. See page 11, lines 19 – 27. It has been discovered that the resulting alloy has improved strength and low temperature ductility.

To further clarify the claimed invention, independent Claims 1 and 10 have been amended to recite that the alloy is a cryomilled aluminum alloy having at least 0.3% by weight of nitrogen that is in the form of aluminum nitride and one or more of magnesium nitride, lithium nitride, silicon nitride, titanium nitride, zirconium nitride, and combinations thereof, Claims 1 and 10 have also been amended to recite that the alloy is cryomilled in a substantially oxygen free atmosphere so that the alloy is substantially free of oxy-nitrides, oxides, and combinations thereof, and wherein the alloy is substantially free of refractory materials. Support for these amendments are found throughout the specification for example, page 9, lines 14 – 15; page 10, line 31 – page 11, line 1; and page 11, lines 13 – 27.

Luton does not disclose or suggest an aluminum alloy having at least 0.3 wt. % nitrogen that is in the form of aluminum nitride and one or more of magnesium nitride, lithium nitride, silicon nitride, titanium nitride, zirconium nitride, and combinations thereof. Rather, Luton specifically teaches cryomilling in oxygen so that the oxygen reacts with either aluminum to form aluminum oxides or with the nitrogen to form oxy-nitrides. Luton further does not teach an aluminum alloy that is substantially free of refractory compounds. In fact, Luton teaches that refractory compounds may be added in amounts up to 25 volume percent. See column 6, lines 19 – 48. Thus, there is no disclosure or suggestion in Luton of a cryomilled alloy that is substantially free of refractory materials and that includes at least 0.3 wt. % nitrogen that is in the form of aluminum nitride and one or more of magnesium nitride, lithium nitride, silicon nitride, titanium nitride, zirconium nitride, and combinations thereof. Therefore, Claims 1 and 10, and any claims dependent thereon are patentable over Luton.

In view of the foregoing amendments and remarks, it is respectfully submitted that the rejections under 35 U.S.C. § 103(a) have been overcome.

Conclusion

It is respectfully submitted that all pending Claims 1-11 are in condition for immediate allowance and an early notification of the allowability of these claims is earnestly solicited. If any matters remain to be resolved, the Examiner is urged to contact the undersigned attorney by telephone at 704-444-1185 to expedite prosecution of this application.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

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Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Timothy J. Balts', with a long horizontal flourish extending to the right.

Timothy J. Balts
Registration No. 51,429

Customer No. 00826
ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Charlotte Office (704) 444-1000
Fax Charlotte Office (704) 444-1111
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